Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FOURTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018

Course Code: CH208

Course Name: CHEMISTRY FOR PROCESS ENGINEERING II (CH)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any two questions, each carries 15 marks Marks

1	a)	Give the principle and experimental set up for the estimation of Fe^{2+} ions using potentiometry?	(7)
	b)	Explain the principle and application of anodic stripping voltammetry.	(4)
	c)	Give any two applications of AAS. What are the common interferences occur during AAS analysis.	(4)
2	a)	Draw the schematic diagram of mass spectrometer and explain its working.	(8)
	b)	Explain the principle of Auger electron spectroscopy.	(4)
	c)	Electrogravimetry can be used for the estimation of metal ions in solution. Explain.	(3)
3	a)	Describe the principle and instrumentation and application of scanning tunnelling microscopy.	(6)
	b)	What is diffusion current in polarography? How is it related to the concentration of the analyte?	(4)
	c)	Write a note on the principle and applications coulometric titrations.	(5)

PART B

Answer any two questions, each carries 15 marks

4	a)	Derive Nernst distribution law.	(5)
	b)	What is critical solution temperature? Draw the temperature- composition diagram for a system containing phenol and water.	(4)
	c)	Give the principle of glucose and urea biosensors.	(6)
5	a)	Give the principle and applications of steam distillation.	(5)
	b)	Explain Debye-Huckel theory for strong electrolytes.	(7)
	c)	What is hydrogen overvoltage? How it occurs?	(3)
6	a)	Give an account on Parkes process.	(4)
	b)	In the distribution of succinic acid between ether and water at 15ºC, 20 ml of the ethereal layer contains 0.092 g of the acid. Find out the weight of the acid present in 50 ml of the aqueous solution in equilibrium with it if the distribution coefficient for succinic acid between water and ether is 5.2.	(4)
	c)	Derive the equation for transport number using Hittorff's theoretical device.	(7)

PART C

Answer any two questions, each carries 20 marks

7	a)	What is adsorption isotherm? Derive Langmuir isotherm and Freundlich isotherm.	(8)
	b)	What are protective colloids? Give two examples.	(3)
	c)	What is nuclear reaction cross section? Give its expression.	(4)
	d)	Explain the liquid drop model of nucleus and describe the mechanism of nuclear fission with this model.	(5)
8	a)	Derive Gibbs adsorption isotherm and give the expression for Gibbs surface excess.	(8)
	b)	What is transient and secular equilibrium of nuclear decay? Give their expressions.	(6)
	c)	Explain the principle and applications of neutron activation analysis.	(6)
9	a)	Give a detailed account on the classification, preparation of colloids.	(8)
	b)	Write the equation for BET adsorption isotherm and explain the terms.	(3)
	c)	What are the medical applications of radioactive isotope.	(4)
	d)	An archaeological specimen when subjected to carbon dating showed β-ray activity 10. A similar sample of fresh material displayed activity 21. Calculate the age of the archaeological sample. The half-life of C-14 is 5730 years.	(5)

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